

**What is Claimed Is:**

1. An isolated nucleic acid molecule comprising an avian matrix attachment region and an avian ovalbumin transcriptional regulatory region.
2. The nucleic acid molecule according to Claim 1, further comprising a second  
5 matrix attachment region.
3. The nucleic acid molecule according to Claim 1, comprising an avian 5' matrix attachment region and an avian 3' matrix attachment region.
4. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule is isolated from a chicken cell.
- 10 5. The nucleic acid molecule according to Claim 1, comprising a nucleotide sequence having at least about 80% identity to the nucleotide sequence according to SEQ ID NO: 1, or the complement thereof.
6. The nucleic acid molecule according to Claim 1, comprising a nucleotide sequence having at least about 95% identity to the nucleotide sequence  
15 according to SEQ ID NO: 1, or the complement thereof.
7. The nucleic acid molecule according to Claim 1, comprising a nucleotide sequence having at least about 99% identity to the nucleotide sequence according to SEQ ID NO: 1, or the complement thereof.
8. The nucleic acid molecule according to Claim 1, comprising the nucleotide  
20 sequence according to SEQ ID NO: 1, or the complement thereof.
9. The nucleic acid molecule according to Claim 7, wherein the nucleic acid molecule consists of the nucleotide sequence according to SEQ ID NO: 1, or the complement thereof.

10. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule is a truncated variant of SEQ ID NO: 1 comprising at least 103 kilobases of SEQ ID NO: 1.
- 5 11. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 having a 5' end selected from the group consisting of the nucleotide positions about 41000, about 56000, about 58350, about 76200 and about 80000 of SEQ ID NO: 1, and having a 3' end selected from the nucleotide positions about 191500, about 187000, about 164500, about 157600, about 157100, about 152000 and  
10 to about 145500 of SEQ ID NO: 1.
12. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 41500 to about position 195101 of SEQ ID NO: 1.
- 15 13. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 41500 to about position 187000 of SEQ ID NO: 1.
- 20 14. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 41500 to about position 164500 of SEQ ID NO: 1.
- 25 15. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 41500 to about position 152000 of SEQ ID NO: 1.

16. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 41500 to about position 145500 of SEQ ID NO: 1.
- 5 17. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 96000 to about position 195101 of SEQ ID NO: 1.
- 10 18. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 96000 to about position 191500 of SEQ ID NO: 1.
- 15 19. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 96000 to about position 187000 of SEQ ID NO: 1.
- 20 20. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 96000 to about position 164500 of SEQ ID NO: 1.
21. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the nucleic acid sequence from about nucleotide position 96000 to about position 152000 of SEQ ID NO: 1.
- 25 22. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule comprises a truncated variant of SEQ ID NO: 1 and comprises the

nucleic acid sequence from about nucleotide position 96000 to about position 145500 of SEQ ID NO: 1.

23. A vector having inserted therein a nucleic acid molecule according to Claim 1.
24. The vector according to Claim 23 selected from the group consisting of an artificial chromosome, a plasmid vector and a viral vector.
25. A liposome composition comprising a nucleic acid molecule according to Claim 1.
26. The nucleic acid molecule according to Claim 1, wherein the nucleic acid molecule is a recombinant nucleic acid molecule.
27. The recombinant nucleic acid molecule according to Claim 26, wherein the ovalbumin transcriptional regulatory region and the matrix attachment region are independently capable of hybridizing under high stringency conditions to the nucleic acid sequence according to SEQ ID NO: 1, or the complement thereof.
28. The recombinant nucleic acid molecule according to Claim 26, further comprising a second matrix attachment region independently capable of hybridizing under high stringency conditions to the nucleic acid sequence according to SEQ ID NO: 1, or the complement thereof.
29. The recombinant nucleic acid molecule according to Claim 26, further comprising a heterologous nucleic acid sequence operably linked to the ovalbumin transcriptional regulatory region.
30. The recombinant nucleic acid molecule according to Claim 26, further comprising an endogenous nucleic acid sequence operably linked to the ovalbumin transcriptional regulatory region.

31. The recombinant nucleic acid molecule according to Claim 26, wherein the ovalbumin transcriptional regulatory region is capable of tissue-specific transcription by an avian oviduct cell.
- 5 32. The recombinant nucleic acid molecule according to Claim 26, further comprising an Internal Ribosome Entry Site.
33. The recombinant nucleic acid molecule according to Claim 32, further comprising a second heterologous nucleic acid sequence operably linked to the Internal Ribosome Entry Site.
- 10 34. A vector having inserted therein a recombinant nucleic acid molecule according to Claim 26,
35. The vector according to Claim 34 selected from the group consisting of a bacterial artificial chromosome, a yeast artificial chromosome, a plasmid vector and a viral vector.
- 15 36. The recombinant nucleic acid molecule according to Claim 26, further comprising a polyadenylation signal sequence.
37. The recombinant nucleic acid molecule according to Claim 29, wherein the heterologous nucleic acid sequence encodes a polypeptide having a codon complement optimized for protein expression in an avian.
- 20 38. The recombinant nucleic acid molecule according to Claim 26 further comprising an origin of replication selected from the group consisting of a bacterial origin of replication and a viral origin of replication.
39. The recombinant nucleic acid molecule according to Claim 26 which is a bacterial artificial chromosome.

40. A recombinant nucleic acid molecule comprising:
- (a) an avian ovalbumin transcriptional regulatory region;
  - (b) an avian 5' matrix attachment region;
  - (c) a heterologous nucleic acid encoding a polypeptide;
  - 5 (d) a polyadenylation signal sequence; and
  - (e) an avian 3' matrix attachment region,
- wherein the avian ovalbumin transcriptional regulatory control region, the 5' avian matrix attachment region, and the avian 3' matrix attachment region each hybridize under high stringency conditions to the nucleic acid sequence
- 10 SEQ ID NO: 1, or the complement thereof.
41. The recombinant nucleic acid molecule according to Claim 40, further comprising an Internal Ribosome Entry Site.
42. A method of generating a genetically transformed avian cell, comprising delivering a nucleic acid molecule according to Claim 1 to the avian cell
- 15 under conditions whereby a genetically transformed avian cell is generated.
43. The method according to Claim 42, wherein the nucleic acid molecule enters the nucleus of the avian cell
44. The method according to Claim 42, wherein the nucleic acid molecule integrates into the nuclear genome of the avian cell.
- 20 45. The method according to Claim 42, wherein the nucleic acid molecule is integrated into the nuclear genome such that it is subject to a reduced chromosomal positioning effect compared to an integrated molecule not having a matrix attachment region element.
46. The method according to Claim 42, wherein the avian cell is selected from a
- 25 chicken cell and a quail cell.

47. The method according to Claim 42, wherein the avian cell is an oviduct cell.
48. The method according to Claim 45, wherein the oviduct cell is a tubular gland cell.
49. The method according to Claim 42, wherein the avian cell is a cultured avian cell.
50. A method of expressing a heterologous polypeptide in an avian cell, comprising the steps of:
- (a) delivering a nucleic acid molecule according to Claim 29 to a recipient avian cell under conditions that generate a genetically transformed avian cell; and
  - (b) culturing the genetically transformed avian cell under conditions that produce expression of a heterologous polypeptide under the control of the avian ovalbumin transcription regulatory region.
51. The method according to Claim 50, wherein the nucleic acid molecule is integrated into the nuclear genome of the recipient avian cell.
52. The method according to Claim 50, wherein the recipient avian cell is a chicken cell.
53. The method according to Claim 50, wherein the recipient avian cell is an oviduct cell.
54. The method according to Claim 50, wherein the recipient avian cell is an oviductal tubular gland cell.
55. An avian cell, or the progeny thereof, comprising a nucleic acid molecule according to Claim 26.

56. The avian cell according to Claim 55, wherein the avian cell, or the progeny thereof, expresses the heterologous polypeptide encoded by the nucleic acid molecule.
57. The avian cell according to Claim 55, wherein the avian cell is selected from a chicken cell and a quail cell.
58. The avian cell according to Claim 55, wherein the avian cell is a chicken cell.
59. The avian cell according to Claim 55, wherein the avian cell is an oviduct cell.
60. The avian cell according to Claim 59, wherein the avian cell is an oviductal tubular gland cell cell.
61. The avian cell according to Claim 55, wherein the avian cell is a cultured cell.
62. A transgenic avian individual comprising a nucleic acid according to Claim 26.
63. The transgenic avian individual according to Claim 62, wherein the avian individual is selected from the group consisting of a chicken, a turkey, a duck, a goose, a quail, a pheasant, a ratite, an ornamental bird or a feral bird.
64. The transgenic avian individual according to Claim 62 which is a chicken.
65. The transgenic avian individual according to Claim 62 which produces the heterologous polypeptide in serum or egg white.
66. The transgenic avian individual according to Claim 65 which produces the heterologous polypeptide in egg white.
67. An avian egg wherein the egg white comprises a heterologous polypeptide expressed from a recombinant nucleic acid molecule according to Claim 29.



68. The egg white of an avian egg of Claim 67.
69. A heterologous polypeptide obtained from an egg of Claim 67.
70. A heterologous polypeptide obtained from an egg of Claim 50.